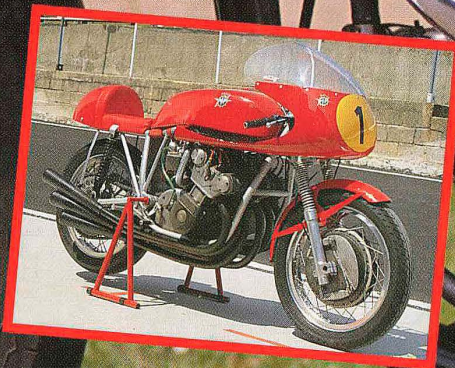


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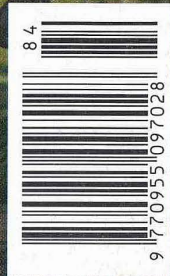
SIDECAR SENSATION

Chris Williams at Mallory

Tiger 900 Test



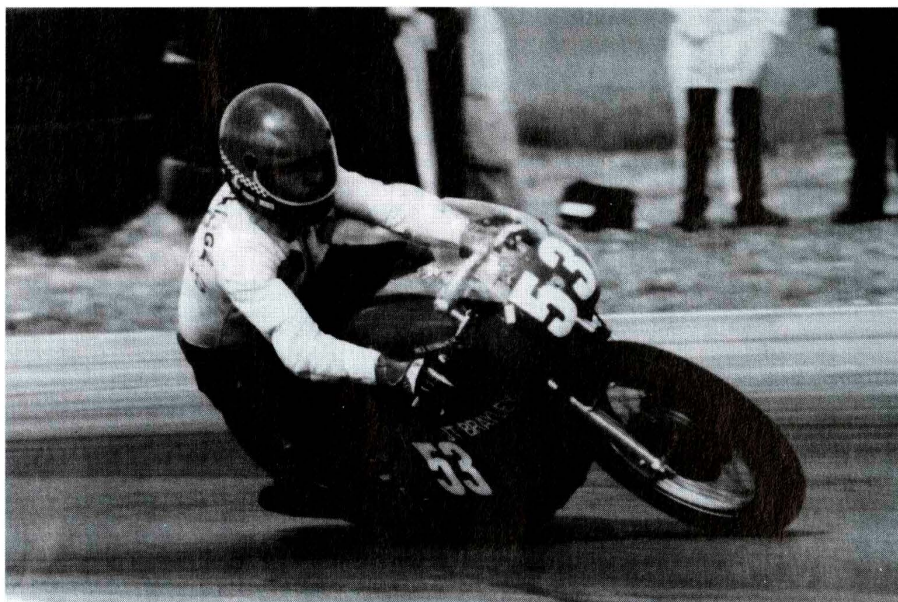
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IN SEARCH OF THE ULTIMATE CARB

Gardner carburettors were an integral part of the racing scene in the Sixties and Seventies, then they disappeared. Rex Edwards tracked down their creator (too modest to have his photograph taken) and discovered that the Gardner carb could be on the verge of a relaunch.



Production of the Gardner is expected to start again in 1995, priced around £150. Rex Edwards is testing one on a 250cc Ducati

I'd already formulated the Gardner carburettor story from flashes of memory, bits of information gathered here and there, and a touch of guesswork. All this without leaving home! It just needed Ron Gardner to check the dates while I polished off a few rough edges. Or so I thought. How wrong can you be?

Any preconceived thoughts that I may have had about Ron simply hitting on a good idea, and cashing in with the manufacture of a well-designed carb, were soon dispelled. After two minutes inside the Gardner's living room, I saw a photograph displaying some 30 different fuel injector and carburettor models dating back to the 1940s. This came as quite an eye-opener, but was nothing compared to what came next; "In between taking my first interest in fuel systems and carbs in

1946, I made a couple of electric-powered bikes, and later designed and built my own desmodromic valve gear. That was mostly back in the Fifties though", said Ron.

Realising that I had opened up a whole new can of worms, it became obvious that Ron's story deserved to fill a book, and a very large one at that. All I could hope to do was rapidly scribble notes as we went along, and to make some references to an Alan Peck article in a 25-year-old copy of *Motor Cyclist Illustrated*. (The Dear Departed — ex-MCI Ed).

Ron's own theory of desmodromics were put to the test when he successfully converted a 1934 VH Ariel to desmo valve gear, to act as a running test-bed. Even more impressive was a 1938 Triumph 500cc Speed Twin when, in his own words, "I reversed the cylinder head,

installed my desmo valve operation and fitted our own fuel injectors, using forced air-at-speed induction. It seemed to work; the standard bike in full road trim with silencers did 108mph, and on 72 octane petrol!" While working on the desmo project Ron encountered a carb problem, because using very high lift cams which shut quickly produced a pressure wave in the induction, causing the carburation to fluctuate at certain revs.

"To solve this, I made an exhaustive study of just about every carb known to man. I realised that all of them had some limitations. If conditions required a change of main jet, then it was quite likely that a change of needle, needle setting, or throttle slide cutaway would also be needed for top performance, yet most people would only change the main jet and tune the pilot to suit. We reasoned

that what was right for one set of conditions, couldn't be right for any other if the needle and slide were left unaltered.

"That was when we decided to design a new carb that would control the mixture by a needle alone. It had, of course, already been done by SU, but theirs was unsuitable for use on a high performance solo motorcycle. I had been making carbs for sale since March 1950, but mostly to fit on engines that I built or tuned."

"Bill Blackburn assisted me in the search for the ultimate carb, but at more or less the same time we were busy turning a 125cc Honda sports bike into a competitive racer. When fitted with our desmo set up and low pressure injectors it would normally rev to 12,000rpm, but by 1960/61 rider Mike Cook could buzz it to 16,000rpm! Incidentally, I organised it for Mike to race in Russia and with another guy called Jackson, he became the first Brit to ride there."

Following that season it became clear that more gains were being made with Ron's carb development than by any other means, so all other interests were dropped.

"The problem that bugged me from the start was that I could never match the accuracy of a conventional carb; we had had the flat tapered needles since 1948, but had never tried the "rotational" factor — rotating the needle for tuning, as well as adjusting it vertically relative to the jet. It was the breakthrough I'd been looking for, and was the subject of my patented design. (British patent 1,129,036, fact fans.)

"Rowland James joined me in 1965. What a character! We would be having a pint one evening, deep in conversation about a new idea; I think I drew a sketch on a napkin, he grabbed it and ran out the door. A day and a half later a bleary eyed Rowland laid the finished article on my desk, saying 'There you go, I'm off to bed now!'"

A 50cc Honda CR110 racer was fitted with one of Ron's carbs with encouraging results, because Ray Smith had to raise

the gearing to prevent over-revving at Brands Hatch in 1965, where he scored a convincing victory over the acknowledged king of 50cc racing, George Ashton.

One of Frank Higley's creations, a Merlin-engined special, was the target of more tests a year later. Rod Scivyer rode one in the Ulster GP with a conventional carb, but failed to qualify in the first practise session, with fuel consumption running at 28mpg. When a Gardner was tried, Rod's lap times were faster (just inside qualifying time) and mpg had risen to 37, with, as an added bonus, a wider spread of power. Ron looked no further for proof of his products after Kevin Cass took win after win, with race and lap records all over the country on his Gardner-equipped Bultacos. "Our claim, although we have never made performance claims for Gardner carbs, is that the flat taper needle meters more accurately, and mixes better than other carbs. There must be something in it", notes Ron wryly, "Or we wouldn't have been copied by Lake, Lectron, E1, Blue Magnum, etc."

The time was ripe after 12 years of hard work to go into production, and form The Gardner Carburettor Co, with Geoff and Alan Tancred joining Rowland and Ron as directors. Sussex rider John Rollason did some useful testing work on his rapid 7R AJS, while Alan Peck (author of the Bill Ivy book *No Time To Lose*) became the first of many riders to use a Gardner on a Manx Norton, achieving some of his best ever results.

"From the start, we were selling carbs as fast as we could make them" said Ron, "Kevin Cass was timed as the fastest privately entered bike in the 1967 Ulster GP, and became our agent in Australia. Reg Pridmore won the AFM championship, and the USA team Power Research handled our interests there. Hugh Anderson became an agent in Holland, where he used our carbs on his grass bikes.

"Towards the end of the 1960/70s, our

The Gardner Carburettor

The major point to note about the Gardner carb is that the needle is fixed and the jet, which is enclosed within the throttle slide, moves. The slide opens downwards, and there is a natural enrichment effect for acceleration, without the need for an accelerator pump.

The needle controls both enrichment and petrol flow, and it has a cross-section which is varied by a shaped flat with an S-profile. This profile can be changed to suit different engines; Gardner provided at least 50 different needle profiles.

Petrol flow rate depends on three variables — the head of fuel, which is adjusted by a remote float chamber; the relative position of needle and jet, which can be varied by the needle adjusting screw; and the vacuum acting on the jet, which is varied by the "rotational effect" referred to by Ron Gardner in the article. The starting point is with the flat of the needle parallel to the airflow; rotating the flat towards the engine increases the vacuum acting on the jet and thus richens the mixture. Rotating it the other way weakens the mixture.

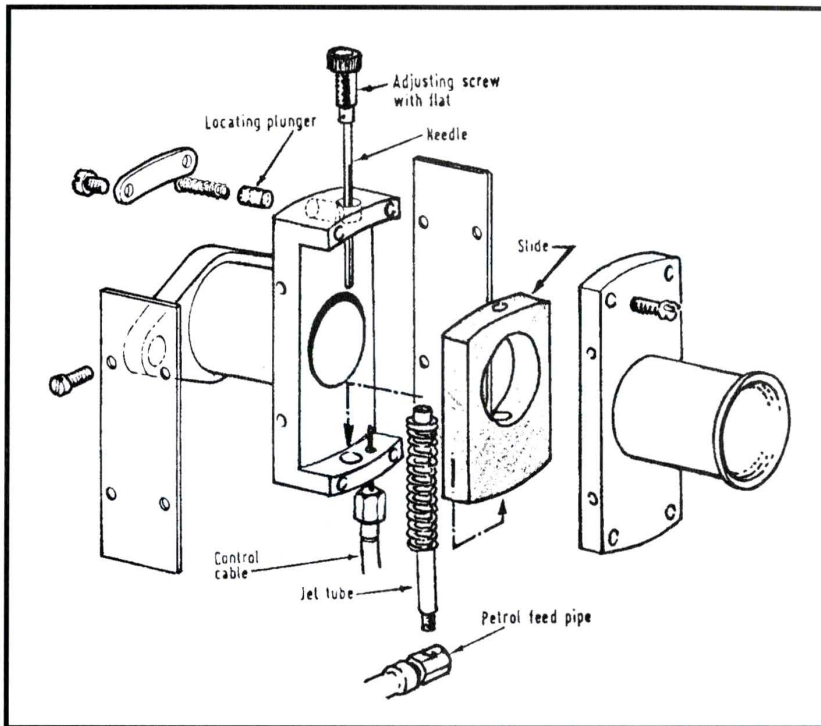
Tuning the Gardner carburettor follows the same sort of sequence as an Amal, for example, but its construction makes the process somewhat simpler. The float chamber must be adjusted to the right height, which is roughly level with the top of the jet at quarter throttle. The needle height is adjusted to give the right mixture at steady state throttle openings, easily achieved with the threaded holder. Finally, the flat of the needle is rotated to give the best mixture on acceleration. This takes the place of experimenting with throttle cutaway on an Amal, and is perhaps the most crucial part of the sequence.

Gardner needle carriers came in 4 degree increments, each type located on a flat by a spring-loaded plunger housed in the carburettor back plate. Once the correct needle profile and angle had been determined and the correct angle needle carrier fitted, the needle could be raised or lowered one turn at a time without going out of rotational tune.

Gardner would also supply carbs with different flange to jet and jet to bellmouth lengths to allow for resonance tuning of the induction tract.



A small selection of Ron's creations over the years

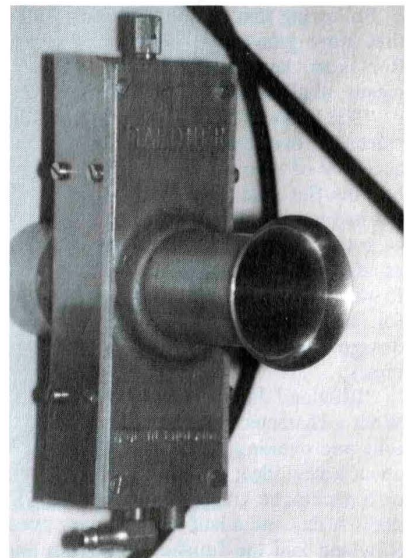


ABOVE & RIGHT: The Gardner carburettor: this radical looking lightweight device was considered by many top riders in the classic period to be the ultimate carb - perhaps it still is

considered too high when Triumph/BSA collapsed. Given those circumstances, Rowland James joined Piper Cams, and Ron sold the company to the International Hettich Group (wound up in the late '70s). "Rowland and I parted on good terms" said Ron, "We always said that we would have another go at it; I had already bought back the patents, tooling and rights of the old companies, but as soon as we were ready, Rowland sadly passed away, which came as a terrible shock."

"Over the years, John (Rollason) and others have been keeping me in touch with the classic scene. I've been busy servicing old Gardners and supplying spares. John Cronshaw has won a couple of championships with one, so I'm encouraged to relaunch the firm in 1995."

Ron is reluctant to make any performance claims about his carbs, other



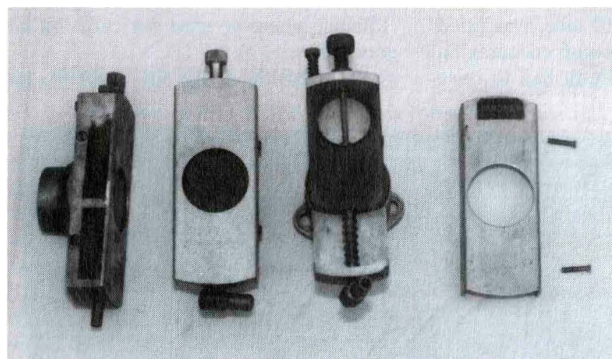
riders included the 500cc British champion Ron Chandler, Rex Butcher, Dave Simmonds and Chas Mortimer — most of the good national runners anyway. Borje Janssen won the 1972 East German GP at Sachsenring on a Gardner kitted 125cc Maico, but one of my happiest associations was with Tom Kirby, who switched his famous team to Gardners".

During this period the firm was also working with Rolls Royce motors, Vauxhall, Reliant, Weslake and Piper Cams, so they were much in demand.

"I even had an American approach me at the Motorcycle Show (where Gardners were listed as standard fittings on the "new" John Tickle Manx T5 racers). This guy asked me if I could make him some really big carbs, like 55mm units! I said sure we can, we could make them as big as dustbins if you like, but they won't be much use to you. What are they for? 'For ma hawg', he drawled. I had no idea what a hog was in those days — could have been an American tractor for all I knew, but if it had happened today, I might have had a man down from the ministry thinking that we were making parts for a Super Gun! After a week or two, piles of cash arrived from the States so we took him seriously and dispatched his order, half expecting them to be returned, but were amazed when several other batches of 50-60mm carbs were ordered — all his mates wanted them!

"Just when we felt on top of the world,

my wife Daphne became very ill; I honestly thought we would lose her, so until she made a full recovery I let the business take a back seat, as by then the bulk of our work was as automotive consultants." With the arrival of the 250/350 TZ Yamahas, the structure of road racing had changed almost overnight, forcing the majority of other bikes into instant obsolescence.



LEFT: A slide, a needle, a jet and a body - the Gardner carb can be stripped for inspection in seconds, rather than minutes

Gardners had designed a new carb called the X4, with integral float, accelerator pump and emission features for Denis Poore, then the magnate of the British motorcycle business. The X4 could only realistically be made as a mass-produced item, and although I'm told that it would have hammered Gardner's Japanese rivals, the risk was

than to say that they will improve starting and pick-up, but riders have reported 10-15% gains on almost every desirable feature a carburettor can possess. "Of course, the latest generation of Mikunis and Keihins have come a long way towards catching us up", he explains, "But I still don't think they are quite there yet". I could see that he wasn't joking.